Enhanced Retention Performance Modeling for Intelligent Tutoring System

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Abstract

The aim of Personalized Adaptive Scheduling System is not only to maximize learning, but also to minimize the tendency to forget. Empirical studies from psychology and cognitive theory of memory indicate that repetition with gradually increasing spacing interval is necessary to promote optimal long-term retention. While all individuals differ in their capacity to learn and retain information, the existing personalized systems attempt to model student retention performance based on learning capabilities only. The present study aims to investigate the extent to which individual differences in learning and forgetfulness help in predicting retention performance, which is essential for designing personalized retrieval practice schedules for a student. This study was conducted using data from Personalized Adaptive Scheduling System in ASSISTments, an adaptive mathematical tutor. The results illustrate the importance of student learning and forgetfulness features in predicting retention performance of a new skill, the proposed prediction model showed a significant improvement from an R2 of 0.2975 with an existing baseline model to an R2 value of 0.3989. In addition the newly identified features are used to predict the retention interval of a student, since ideal personalized retention schedules
should be roughly equal to the retention interval of the student. The predictive accuracy of the linear regression model thus obtained was found to be statistically significant with an R2 value of 0.413.

References


Index Terms

Computer Science  Artificial Intelligence
Keywords

Retention Performance, Personalized Adaptive Scheduling System, Automatic Reassessment and Relearning System.